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УТИЛІЗАЦІЯ ВІДХОДІВ МЕТОДОМ СИЛІКАТИЗАЦІЇ

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WASTE DISPOSAL BY APPLYING THE METHOD OF SILICIFICATION

It is clear nowadays, that the future of human civilization is characterized not by the scientific-technological progress, but sufficient ecological knowledge, which is able to provide the balance of social and natural processes. Their background is the mutual contacts with the environment, the guarantee of which is the observance of natural laws of reasonable expediency.

The authors have investigated in the laboratory the method of recycling of the slime galvanic wastes, basing on the principle of silicate boudnering and polycondensate hardening. The wastes of galvanic enterprises are the compounds of zinc, nickel, copper, cadmium and other toxical substances, which are deposited into the sediment while purification of sewages and used solutions of electrolytes. While accumulating such wastes and their long-term storing, their appears a danger to pollute the environment, caused by the migration phenomena under the effect of different atmosphere factors.

The essence of the method is the localization of toxical, chemically active components of the galvanic slime while transforming it into solid insoluble material, inactive to the effect of environment. The aim is achieved while using the principle of double-soluble silicatisation.

The method is realized in such a way: middle-grain quartz sand is mixed with the dehydrated galvanic slime. The solution of sodium silicate (water glass) is introduced into the mixture until the viscous homogeneous mass is formed, which can be shaped (brick, block, etc.). The shaped material is located in the special chemical solution, which contains ions of bivalent metal, for three days. During this time the material becomes solid preserving its shape. Then it is rinsed in running water, dried in the open air to "mature". In five-six days the processes of structure-forming stop on the "body" of the material, owing to which the mechanical strength hardness and chemical stability is obtained. The major role in the technological process of the method in question is that of sodium silicate. Being hydrophilic (water-retaining) colloid, able to create stable gel, while contacting with the dispersed solid particles of slime, it solvates them with polymer molecules aggregates, owing to which they are included into the solid phase while the gel hardening under the action of the electrolyte solution. These processes are caused by the effect of complex reasons, the main of which are: electrostatic attraction of different molecules and parts, chemical interreaction of ions, coagulation of the colloid solution. As the result all this results in the transformation of the original solution into the solid, and the silicate boudnering phase provides its chemical water and aggressive medium resistance. The presented method is easy to be carried out, and available, it does not need great power expenditures. It does not result in any additional wastes. It can be applied in the places of the slimes storing, which is an important condition for the wastes recycling, because, as it is known, any transporting broadens the area of the migration effect on the environment. Thus, inactive obtained material possesses properties of the artificial sand (rock) and can be used for special purposes – production of borders, fence components and other gardening-parking architecture items. It should be stressed, that this sand materials has been toxicologically tested, its effect on the hydro-biometrics being analyzed. The obtained results testify its water resistance and inactiveness.